

Observation and modelling of ambient nitrous acid (HONO) at a rural site (Wangdu) in the North China Plain in summer 2014

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Significant missing daytime HONO sources were determined in many places worldwide from urban to rural conditions. In recent field campaigns performed in Chinese megacity regions such as Pearl River Delta, Yangtze River Delta and North China Plain, strong missing HONO sources were also determined and possible explanations including photoenhanced heterogeneous conversion of NO_2 , photolysis of particulate nitrate, soil emission, and emission from biomass burning. In the present work, we performed in situ measurements of ambient HONO concentration at a rural site (Wangdu) in North China Plain in summer 2014. The observed HONO concentration ranges from tens ppt to 5 ppb. The relations between observed HONO concentration and nitrogen oxide, aerosol and gas-phase chemistry are discussed with statistical methods. Moreover, we use an observational constrained box model to explore the possible roles of the state of art HONO production mechanisms. In addition, after the day of fertilization, we observed a daytime HONO peak around noon time which was distinct from other days by the HONO/ NO_2 ratio. We believe this peak is a strong indication of soil HONO emission since our site was located in center of a large wheat field. Compared to other days, this increased HONO concentration contributes significantly to the OH production around noontime.